

ILWW Systemwide Demonstration Initial Outputs

Presenter Name

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Duty Location

HQUSACE



®

US Army Corps of Engineers
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BLUF

- On-site portion of demonstration concluded successfully
- Initial draft Project Maintenance Management Plans (PMMPs) developed (12 project sites + Navigation Channels)
- Follow-up engagement to continue through FY16 budget build (May 2014)
- Draft AAR in development
- Future demonstrations under consideration



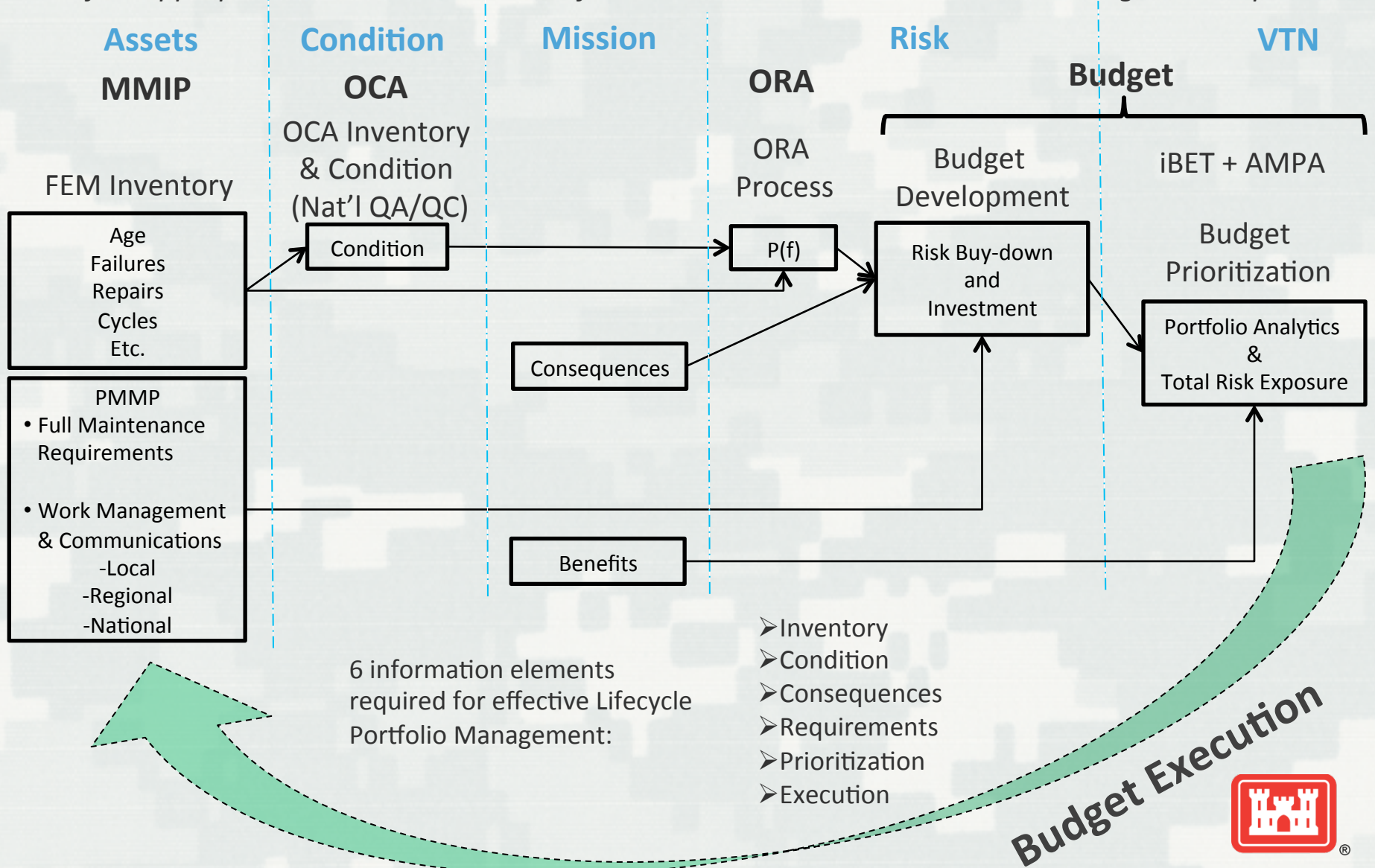
Lifecycle Portfolio Management

- Translate **Strategic Vision** into **Investment Actions** to Shape the Future
 - Establish Corporate Consistency of investment processes and execution to develop Credibility
 - Focus on Mission-Critical Components
 - Prioritize investment actions using Investment Cost vs. Performance Risk
 - Develop Lifecycle View of potential Asset Investment Strategies
- **Challenge: cannot presently define or describe status of projects now (reliability, readiness, condition, risk exposure, total asset costs, etc.)**



Lifecycle Portfolio Management Process

Define appropriate data and IT solutions for linked maintenance execution and budget development



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System MMIP Development

1. Identify **Critical** vs. **Non-Critical** assets and components (mission-critical)
2. Identify appropriate **Levels of Service** (LoS) for Critical assets/components (Business Line/Mission input)
3. Using LoS, determine appropriate **Levels of Performance** (LoP) for Critical assets/components
4. Identify **total annual maintenance requirements** for Critical assets/components
5. Build PM worksheets based on those requirements
6. Build initial draft PMMP using critical inventory, PM worksheets, and LoP determinations



Levels of Service (LoS)

Levels of Service: Inland Navigation Locks

ANNEX A to OPORD 2012-63 USACE Implementation of Inland Marine Transportation System (IMTS) Process Improvement, Standard Levels of Service

Table 1: Definition of Levels of Service

Level #	Title	Description
1	Full Service	24 hours per day, 7 days a week, 365 days a year 24/7/365
2	Reduced Service - Two Shifts Per Day	16-20 hours per day, 7 days a week, 365 days a year (basically two shifts of either 8 or 10 hrs)
3	Limited Service - Single Shift	8-12 hours per day, 7 days a week, 365 days a year
4	Scheduled Service - Set times per day	Lockages (including recreation craft) at set times per day. For example 8 a.m. and 4 pm.
5	Weekends & Holidays	Lockages on weekends and holidays only
6	Service by Appointment	Commercial lockages by appointment

Surrogate Levels of Service: Other Assets

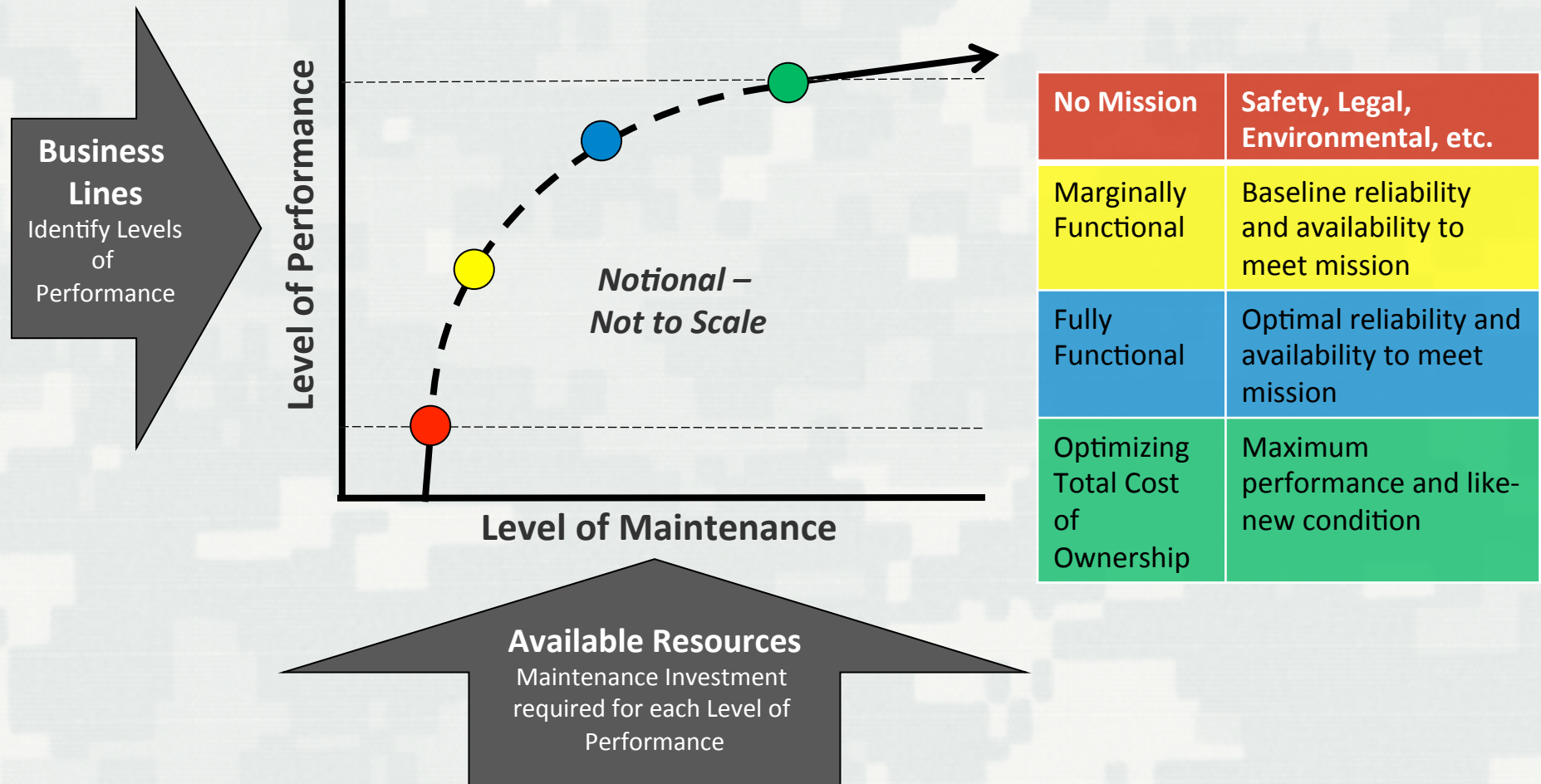
High

Medium

Low



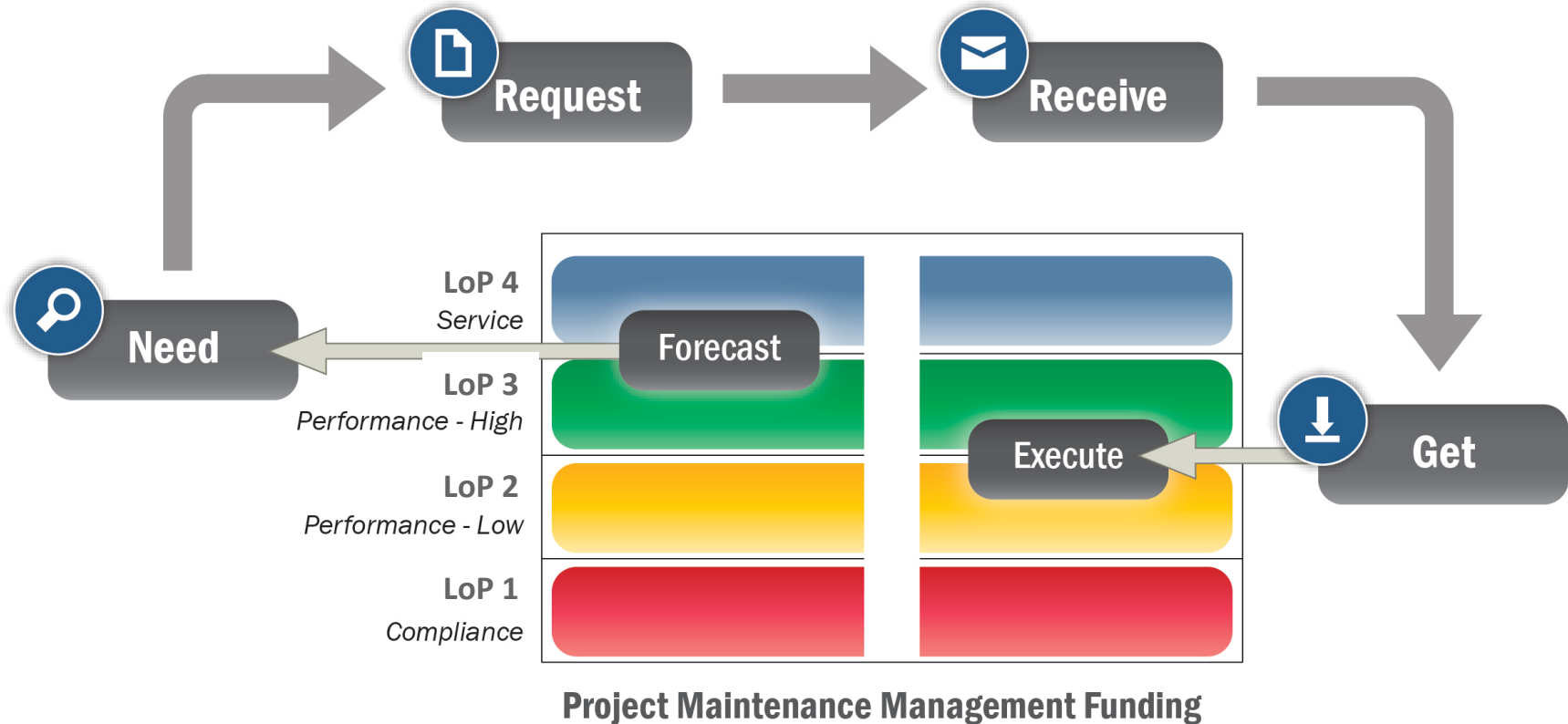
Maintenance Management Improvement Plan Pilots - Levels of Performance



See “USACE Strategic Maintenance Management Report” – located at <https://cops.usace.army.mil/sites/AM/MM/Shared%20Documents/Forms/AllItems.aspx>



Maintenance Management Linked to Resource Execution



Five Expectations of USACE Maintenance Management:

1. What have you got (Inventory)
2. What shape is it in (Condition)
3. What do you need (Budget Request)
4. What do you get (Budget Allocation)
5. Manage the Gap



Maintenance Management Improvement Plan Pilots: Project Maintenance Management Plan Development Example

CHIEF JOSEPH POWERHOUSE

Chief Joseph Equipment and Checklists Sorted by System Equipment Type		Total Quantity of Each Equipment Type	Annualized Labor-Hrs for Each Type of Equipment	Labor-Hrs by Maintenance Frequencies for Total Quantities of Equipment					Total Annualized Labor-Hrs for Each Equip. Type
				W	M	Q	S	A	
SAFETY/SECURITY									
Heat and Vent System		5	11.050	49.430	23.580	5.568	13.836	15.550	104.680
Indication and Annunciation		2	2.138	19.772	7.000	4.004	2.462	7.836	42.464
Fire Pumps		3	2.060	29.658	9.928	2.552	1.136	2.888	44.022
Piping and Valves		312	4.336				8.984	46.472	63.336
BMS		1	2.336		2.936	2.462	1.241	2.816	11.241
Proximity Card System		1	1.336			0.312	1.241	2.816	5.371
EMERGENCY POWER									
125 VDC Battery Bank #1		1	16.080			0.624	2.654	11.826	15.314
125 VDC Battery Bank #2		1	16.080			0.624	2.654	11.826	15.314
250 VDC Battery Bank #3		1	8.476			0.312	1.326	5.401	9.165
Battery Switchboard		1	2.060			0.624	2.654	11.826	15.314
Chargers		2	6.822			0.624	2.654	11.826	15.314
Emergency Lighting		23	6.640			0.624	2.654	11.826	15.314
24/48 VDC Battery Bank		2	5.640			0.312	1.241	2.816	10.742
Referrred AC Power		1	5.640			0.312	1.241	2.816	5.371
MECHANICAL									
HVAC Precipitron Units		4	33.924	35.960	35.960	5.152	5.152	39.544	123.768
Heat Pump		1	5.316	9.240	3.544		0.443		13.670
Boiler		2	1.179					2.246	2.246
Compressed Air System		1	5.099			2.428	1.214	4.866	
Service Air System		1	12.887		6.992	1.748	0.874	3.237	12.887
Units 1-16 Circuit Breaker Air System		16	10.907		111.872	27.998	13.984	20.688	174.512
OTHER EQUIPMENT									
Bridge Crane #1		1	12.887		6.992	1.748	0.874	3.237	12.887
Bridge Crane #2		1	10.907		6.992	1.748	0.874	1.293	10.907
Tallrace Crane		1	9.912				4.956	4.956	9.912

Assets
Sorted by System

Estimated Costs (time, labor, & materials)
Sorted by Frequency
Categorized by Level of Performance

Safety and Security Shop Labor-Hours by Frequency =	39.880	39.880	14.785	24.112	79.846	204.852
Emergency Power Shop Labor-Hours by Frequency =			0.312	1.241	3.818	5.371
Mechanical Shop Labor-Hours by Frequency =	46.200	348.152	84.492	45.265	102.283	626.392
Generation Shop Labor-Hours by Frequency =	213.208	255.208	11.826	11.826	11.826	1611.652
Plumbing Shop Labor-Hours by Frequency =	11.800	39.584	11.800	11.800	11.800	112.458
Electrical Shop Labor-Hours by Frequency =	1.101	1999.378	847.194	432.291	477.977	3757.931
Structure Shop Labor-Hours by Frequency =						
Other Equipment Shop Labor-Hours by Frequency =						
Total Labor-Hours =	371.169	2681.210	1067.268	1000.285	1248.364	6368.296

Total Estimated Cost
By System and Frequency

Level 1	Level 2	Level 3	Level 4
55.200	49.430		
55.462	19.772		
7.836	29.658		
4.336			
2.336	0.312		
1.336			
16.080	0.624		
16.080	0.624		
8.476	0.312		
2.060			
6.822			
6.640			
5.640			
5.640			
33.924	35.960	35.960	5.152
5.316	9.240	3.544	0.443
1.179			
5.099		2.428	1.214
12.887	6.992	1.748	0.874
10.907	111.872	27.998	13.984
12.887	6.992	1.748	0.874
10.907	6.992	1.748	0.874
9.912			4.956

Total Estimated Cost
By System, Frequency, and
Level of Performance

Level 1	Level 2	Level 3	Level 4
55.200	49.430		
55.462	19.772		
7.836	29.658		
4.336			
2.336	0.312		
1.336			
16.080	0.624		
16.080	0.624		
8.476	0.312		
2.060			
6.822			
6.640			
5.640			
5.640			
33.924	35.960	35.960	5.152
5.316	9.240	3.544	0.443
1.179			
5.099		2.428	1.214
12.887	6.992	1.748	0.874
10.907	111.872	27.998	13.984
12.887	6.992	1.748	0.874
10.907	6.992	1.748	0.874
9.912			4.956

Compiled Labor-Hours

Total Estimated Cost

Level 1	Level 2	Level 3	Level 4
55.200	49.430		
55.462	19.772		
7.836	29.658		
4.336			
2.336	0.312		
1.336			
16.080	0.624		
16.080	0.624		
8.476	0.312		
2.060			
6.822			
6.640			
5.640			
5.640			
33.924	35.960	35.960	5.152
5.316	9.240	3.544	0.443
1.179			
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12.887	6.992	1.748	0.874
10.907	111.872	27.998	13.984
12.887	6.992	1.748	0.874
10.907	6.992	1.748	0.874
9.912			4.956

Project Maintenance Management Plan Development Example

Microsoft Excel - revServiceWW30Jan14.xlsx

Peoria Lock and Dam PMMP Summary Sheet

xxx SF, (B5IWPE/MVRI-PE)

Peoria Lock and Dam PMMP Summary Sheet														
xxx SF, (B5IWPE/MVRI-PE)														
Business Line			Total Quantity of Each Equipment Type	Labor-Hrs for Each Type of Equipment	Labor-Hrs by PM Frequencies						Total Annualized Labor-Hrs for Each Equip. Type			
Equipment and Checklists					for Total Quantities of									
Sorted by System					Equipment									
Checklist	Equipment Type				D	W	M	Q	S	A				
Sys/Line No.														
FRM - Dam														
FRM - Dam														
FRM - Dam														
NAV - Lock														
NAV - Lock														
NAV - Lock														
BSIPE-1951.B5IW	z Inactive Culvert Valve (PE-E) Bi-Weekly		1											
...	BSIPE-39475.V Valve, Hydraulic Tainter (PE-E) Weekly		4											
BSIPE-1953.B5IW	z Inactive Tow Haulage (PE-E) Monthly		1											
...	BSIPE-39487.T Tow Haulage (PE-E) Weekly		2											
...	BSIPE-39491.T Tow Haulage (PE-E) Monthly		2											
BSIPE-7338.B5IW	Compressor, Air System (PE-E) Weekly		1											
BSIPE-7339.B5IW	Gates, Miter (PE-E) Weekly		4											
BSIPE-7718.B5IW	Compressor, Air System (PE-E) Monthly		1											
BSIPE-7720.B5IW	Gates, Miter (PE-E) Monthly		4											
...	BSIPE-39479.z z Inactive Gates, Miter (PE-E) Annual		2											
...	BSIPE-39480.z z Inactive Gates, Miter (PE-E) Monthly		2											
...	BSIPE-39481.z z Inactive Gates, Miter (PE-E) Semi-Annual		2											
BSIPE-7722.B5IW	Valves, Air System (PE-E) Monthly		1											
...	BSIWPELO1AV.Va Valves, Air System (PE-E) Monthly		1											
BSIPE-7723.B5IW	Generator, Emergency, Office (PE-E) Bi-Weekly		1											
BSIPE-7724.B5IW	Generator, Emergency, Lockhouse (PE-E) Bi-Weekly		1											
BSIPE-7725.B5IW	Generator, Emergency, Lockhouse (PE-E) Annual		1											
...	BSIPE-39472.G Generator, Emergency, Lockhouse (PE-E) Monthly		1											
BSIPE-7841.B5IW	Tow Haulage (PE-E) Quarterly		2											
...	BSIPE-39490.T Tow Haulage (PE-E) Semi-Annual		2											
...	BSIPE-39491.T Tow Haulage (PE-E) Monthly		2											
...	BSIPE-50535.T Tow Haulage (PE-E) Annual		2											
BSIPE-7844.B5IW	Piping, Air System, Setup (PE-E) Annual		1											
BSIPE-7845.B5IW	Hydraulic System (PE-E) Weekly		1											
BSIPE-7846.B5IW	Hydraulic System (PE-E) Monthly		1											
...	BSIPE-50438.H Hydraulic System (PE-E) Semi-Annual		1											
...	BSIPE-50439.H Hydraulic System (PE-E) Annual		1											
BSIPE-7882.B5IW	Compressor, Air System (PE-E) Annual		1											
BSIPE-7888.B5IW	PLC Control (PE-E) Annual		1											
NAV - Dam														
NAV - Dam														
NAV - Dam														
BSIPE-7397.B5IW	z Gate, Tainter (PE-E) D Annual		6											
...	BSIPE-39485.G Gate, Tainter (PE-E) Annual		6											
...	BSIPE-50582.G Gate, Tainter (PE-E) Semi-Annual		6											
FRM - Dam														
FRM - Dam														
FRM - Dam														
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NAV - Lock														
BSIPE-1951.B5IW	z Inactive Culvert Valve (PE-E) Bi-Weekly		1											
...	BSIPE-39475.V Valve, Hydraulic Tainter (PE-E) Weekly		4											
BSIPE-1953.B5IW	z Inactive Tow Haulage (PE-E) Monthly		1											
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BSIPE-7718.B5IW	Compressor, Air System (PE-E) Monthly		1											
BSIPE-7720.B5IW	Gates, Miter (PE-E) Monthly		4											
...	BSIPE-39479.z z Inactive Gates, Miter (PE-E) Annual		2											
...	BSIPE-39480.z z Inactive Gates, Miter (PE-E) Monthly		2											
...	BSIPE-39481.z z Inactive Gates, Miter (PE-E) Semi-Annual		2											
BSIPE-7722.B5IW	Valves, Air System (PE-E) Monthly		1											
...	BSIWPELO1AV.Va Valves, Air System (PE-E) Monthly		1											
BSIPE-7723.B5IW	Generator, Emergency, Office (PE-E) Bi-Weekly		1											
BSIPE-7724.B5IW	Generator, Emergency, Lockhouse (PE-E) Bi-Weekly		1											
BSIPE-7725.B5IW	Generator, Emergency, Lockhouse (PE-E) Annual		1											
...	BSIPE-39472.G Generator, Emergency, Lockhouse (PE-E) Monthly		1											
BSIPE-7841.B5IW	Tow Haulage (PE-E) Quarterly		2											
...	BSIPE-39490.T Tow Haulage (PE-E) Semi-Annual		2											
...	BSIPE-39491.T Tow Haulage (PE-E) Monthly		2											
...	BSIPE-50535.T Tow Haulage (PE-E) Annual		2											
BSIPE-7844.B5IW	Piping, Air System, Setup (PE-E) Annual		1											
BSIPE-7845.B5IW	Hydraulic System (PE-E) Weekly		1											
BSIPE-7846.B5IW	Hydraulic System (PE-E) Monthly		1											
...	BSIPE-50438.H Hydraulic System (PE-E) Semi-Annual		1											
...	BSIPE-50439.H Hydraulic System (PE-E) Annual		1											
BSIPE-7882.B5IW	Compressor, Air System (PE-E) Annual		1											
BSIPE-7888.B5IW	PLC Control (PE-E) Annual		1											
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BSIPE-7725.B5IW	Generator, Emergency, Lockhouse (PE-E) Annual		1											
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...	BSIPE-39491.T Tow Haulage (PE-E) Monthly		2							</				

PEORIA
LAGRANGE

LOS 1 365/24/7
LOP 3 FULLY FUNCTION

SAFETY GEAR
UTILITIES
LOCK
STANDBY KENSET
TRAFFIC HANDLE SIGNALS
UTILITIES
LOCK HOUSE
GATES
PINTLES, ETC.
STRUCTURE
LOCK MASTER - SCOUR PROTECTION - SIGNALING
FETTER VALVES
HYD. MOTORS/PUMPS
ELEC.
OPERATING EQUIP.
ELEC. DISTRIBUTION SYS.
* DOUBBLER
DAM
M. BOAT CRANE
M. BOAT
M. BOAT EXCAVATOR
TOWBOAT
109 WICKETS
STRUCTURE
TANNER GATE
DIST. SYS.
WEIR WALL
OPER. EQUIP.
ENS - BOUNDARIES



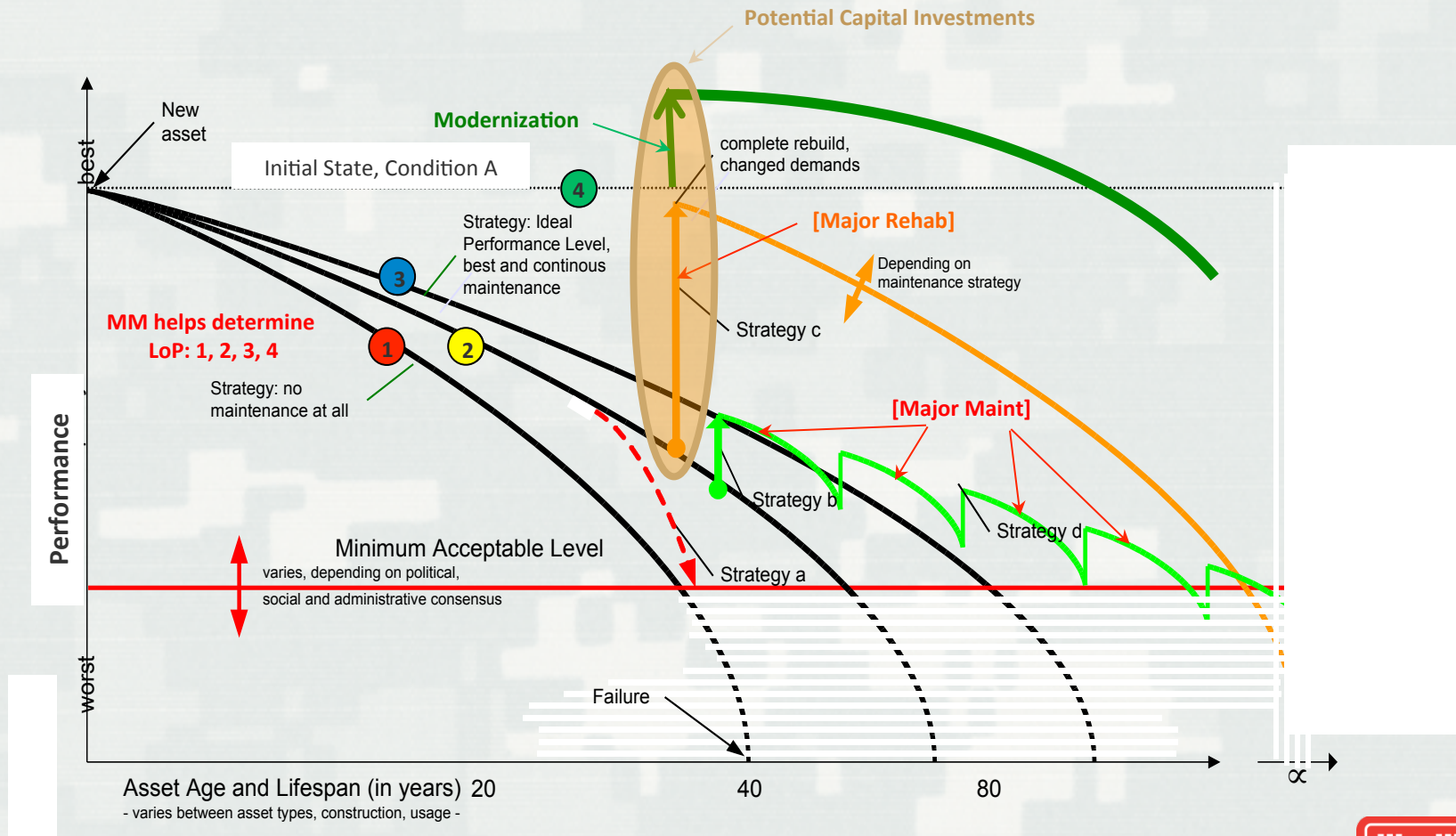
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System Next Steps

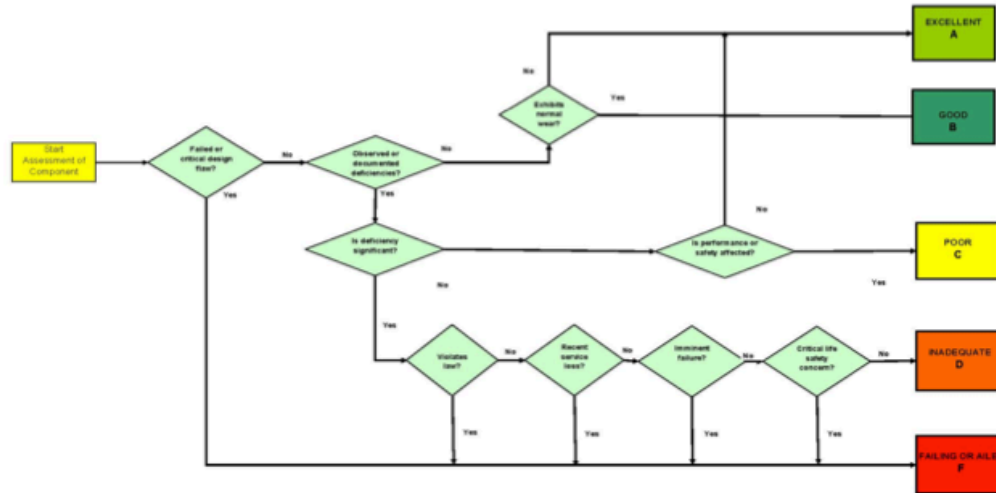
7. Utilize PMMP data to build draft maintenance work packages, including lifecycle inputs as appropriate
8. Utilize existing OCA data to provide necessary condition information (determine OCA data gaps)
9. Utilize existing ORA processes to develop risk-informed budget work packages (determine ORA data gaps)
10. Utilize Asset Management Portfolio Analytics (AMPA) to prioritize IWW maintenance work packages



Asset Lifecycle Investment Strategies and LoPs



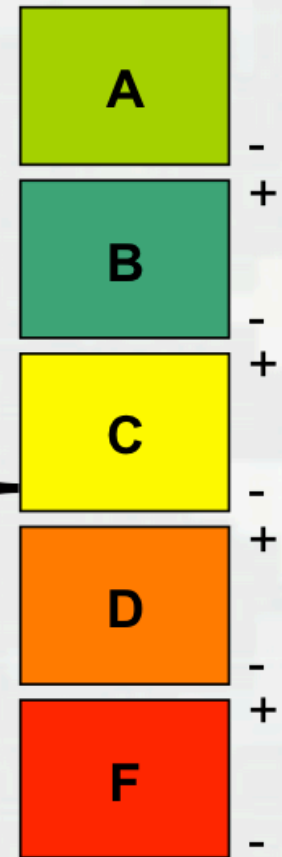
Operational Condition Assessments



Condition Rating Logic/Flow Chart

Rating Increment	Rationale
Plus (+)	a. The components condition has worsened and the rating has dropped to the next lower rating since the last OCA inspection cycle. OR, b. There is no evidence, documented or observed, that the component's condition will continue to worsen to the next lower condition rating within the next OCA inspection cycle.
Neutral	a. The condition rating is the same as the last OCA inspection. OR, b) There is no definitive evidence, documented or observed, that the condition will worsen and drop to the next lower condition rating within the next OCA inspection cycle.
Minus (-)	a. There is definitive evidence, documented or observed, that the component's condition will worsen to the next lower condition rating level(s) within the next OCA inspection cycle. OR, b. If in a "failed" state, there is a high degree of confidence that the component will completely fail within the next OCA inspection cycle.

CONDITION RATING		DEFINITION
A	EXCELLENT	1) Has not failed AND 2) does not have critical design flaw AND 3) no documented or observed deficiencies based on available data or studies AND 4) does not show signs of normal wear
B	GOOD	1) Has not failed AND 2) does not have critical design flaw AND 3) no documented or observed significant deficiencies based on available data or studies AND 4) deficiencies do not impact performance or safety. Best condition rating allowed if component shows signs of normal wear.
C	POOR	1) Has not failed AND 2) does not have critical design flaw AND 3) no documented or observed significant deficiencies based on available data, studies, or observed project performance issue AND 4) deficiencies do impact performance or safety.
D	INADEQUATE	1) Has not failed AND 2) does not have critical design flaw AND 3) has documented or observed significant deficiencies based on available data, studies, or has an observed project performance issue AND 4) does not violate law, failure is not imminent before next OCA, has not experienced closure/loss of service due to current condition in recent history, and no critical life safety concern exists.
F	FAILING OR FAILED	1) Has failed OR 2) has critical design flaw OR 3) has documented or observed significant deficiencies based on available data, studies, or has an observed project performance issue AND one or more of the following is true; violates law, failure is imminent before next OCA, has experienced closure/loss of service due to current condition in recent history, or critical life safety concern exists.

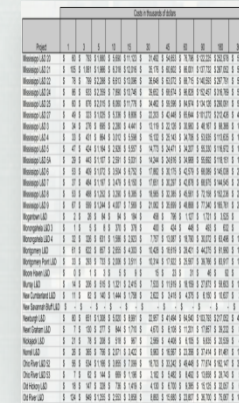


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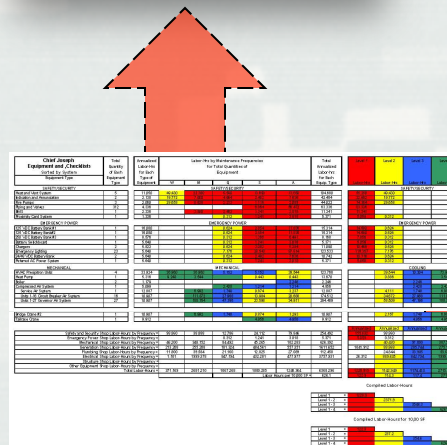
Consistent and Repeatable Process!

For EACH Inland Navigation Site (to Component level):

Econ Impact on Shippers and Carriers



= Risk
(@ Component level)



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Asset Management Portfolio Analytics

AMPA Pareto Chart Analysis

Select a new Project ID Type: (All)

Update Pareto Chart

Current Project ID Type	(All)
LRD Funded Cost (\$1,000's)	255,489
LRD Funded Value	12,145,373
AMPA Funded Cost (\$1,000's)	256,999
AMPA Funded Value	19,195,125

This worksheet will create Pareto charts of the AMPA and LRD budget data. The main blue curve indicates all of the available packages and represents an unbounded analysis. The Green data point marks the LRD budget, while the Red datapoint marks the AMPA funding recommendation. The "Project ID Type" box can be changed using the dropdown box at the top. Clicking the "Update Pareto Chart" button will then update the data and chart below.

AMPA Pareto Chart: All Project Types

